REMARKS

This Amendment responds to the Office Action dated May 5, 2006 in which the Examiner rejected claims 1-12 and 19-29 under 35 U.S.C. §103.

As indicated above, minor informalities in the specification have been corrected. Therefore, applicants respectfully request the Examiner approves the corrections.

As indicated above, claims 1 and 6 have been amended in order to make explicit what is implicit in the claims. The amendment is unrelated to a statutory requirement for patentability.

Claim 1 claims a method of generating x-ray or EUV radiation and claim 6 is an arrangement for generation thereof. The device and method include urging a material through a flexible capillary tube having an orifice which is an integral part of the capillary tubing. The target material is cooled during its propagation from the input end to the output end of the capillary tubing.

Through the structure and method of the claimed invention having a flexible capillary tubing with an orifice which is an integral part of the capillary tubing and cooling the target material during its propagation from the input end to the output end of the capillary tubing as claimed in claims 1 and 6, the claimed invention provides a method and arrangement for generating x-ray or EUV radiation in which the cooling process is greatly simplified while the number of joints in the supply system is reduced, thereby reducing problems relating to pollution/clogging of the supply system. The prior art does now show, teach or suggest the invention as claimed in claims 1 and 6.

Claims 1-12 and 19-29 were rejected under 35 U.S.C. § 103 as being unpatentable over *Hertz et al* (US. Patent No. 6,002,744) in view of *Hertz et al* (U.S. Patent No. 6,760,406).

Hertz et al '744 appears to disclose a method and an apparatus for generating X-ray or EUV radiation via laser plasma interaction with a target in a chamber. (Column 1, lines 7-9). For the forming of microscopic and spatially stable jets of liquid in vacuum, use is here made of a spatially continuous jet 17 of liquid, which forms in a vacuum chamber 8 as is evident from FIG. 2. The liquid 7 is urged under high pressure (usually 5-100 atmospheres) from a pump or pressure vessel 14 through a small nozzle 10, the diameter of which usually is smaller than about 100 μm and typically one or two up to a few tens of micrometers. (Column 4, lines 4-11). When the liquid 7 leaves the nozzle 10, it is cooled by evaporation. It is conceivable that the jet 17 may freeze, such that no droplets 12 are formed. The focused laser beam 11 may, within the scope of the invention, be focused on a spatially continuous portion of the thus frozen jet. Also in this case, the laser light is focused in a point on the jet between the nozzle 10 and a fictitious drop-formation point. (Column 4, lines 26-32).

Thus, *Hertz et al* '744 merely discloses in Figure 2 a nozzle separate from the liquid line 7. Nothing in *Hertz et al* '744 shows, teaches or suggests the output end of the capillary tubing has an orifice which is an integral part of the capillary tubing as claimed in claims 1 and 6. Rather, *Hertz et al* '744 only discloses a separate nozzle 10.

Additionally, *Hertz et al* '744 discloses a vessel 14, a nozzle 10 and the liquid line 7. Nothing in *Hertz et al* '744 shows, teaches or suggests flexible capillary

tubing as claimed in claims 1 and 6. Rather, *Hertz et al* '744 merely discloses in Figure 2 a vessel 14, nozzle 10 and liquid line 7.

Finally, *Hertz et al* '744 discloses that as the liquid leaves the nozzle 10 it is cooled by evaporation. Nothing in *Hertz et al* '744 shows, teaches or suggests cooling the target material during its propagation from the input end to the output end of the capillary tubing as claimed in claims 1 and 6. Rather, *Hertz et al* '744 is silent about on-line cooling.

Hertz et al '406 appears to disclose a method and an apparatus for generating X-ray or EUV radiation, i.e. radiation in the wavelength region of approximately 0.01-100 nm. (Column 1, lines 9-12). The microscopic jet 2 of liquid xenon is spatially continuous and is formed in a vacuum chamber 3, as shown in FIG. 1. In general, liquid xenon 4 is urged under high pressure (usually 5-500 atmospheres) from a pump (not shown) or a pressure vessel 5 through a small nozzle 6 having an orifice diameter which usually is smaller than about 100 .mu.m and typically a few to up to a few tens of micrometers. This results in a microscopic jet 2 of liquid of essentially the same diameter as the orifice diameter and with a speed of about ten m/s to a few hundred m/s. In one arrangement (not shown), the liquid xenon is produced separately and then forced through the nozzle by a pump or other pressure-producing arrangement. Alternatively, as shown in FIG. 1, the pressure of gaseous xenon 7 itself is used as the driver. Here, xenon gas is forced at a pressure of about 5-100 bar into the pressure vessel 5 which is cooled to about 160-200 K by a Gifford-McMahon-type or other cold head 8. The glass capillary nozzle 6 is attached directly to the pressure vessel 5, producing the microscopic jet 2 of liquid xenon in the low-pressure chamber 3. The laser beam 1' is controlled to interact with the spatially

continuous jet 2. For most liquids, the jet 2 propagates in the chamber 3 in a given direction towards a break-up point (not shown), at which it should spontaneously separate into droplets or a spray. In the exemplifying embodiment shown in FIG. 1, the laser beam 1' is focused on the jet 2 upstream of any such break-up point. For many cryogenic liquids, such as xenon, the jet 2 is rapidly cooled by evaporation as it leaves the nozzle 6, and in many cases the jet 2 freezes close to the nozzle 6 so that no droplets are formed. In that case, the laser beam 1' could be focused on a spatially continuous portion of the thus frozen jet 2. (Column 6, lines 18-50). The heating of the nozzle tip 10 is preferably local since a general heating of the liquid xenon could result in a spray being formed instead of a spatially continuous jet 2. (Column 6, lines 63-65).

Thus, *Hertz et al* '406 discloses a pressure vessel 5, and small nozzle 6. Nothing in *Hertz et al* '406 shows, teaches or suggests flexible capillary tubing as claimed in claims 1 and 6. Rather, *Hertz et al* '406 only discloses a pressure vessel 5 and a small nozzle 6.

Additionally, since nothing in *Hertz et al* '406 shows, teaches or suggests flexible capillary tubing, nothing in *Hertz et al* '406 shows, teaches or suggests an output end of the capillary tubing having an orifice which is an integral part of the capillary tubing as claimed in claims 1 and 6.

Finally, *Hertz et al* '406 merely discloses a) the jet 2 is rapidly cooled by evaporation as it leaves the nozzle 6 (column 6, lines 45-46) and heating the nozzle tip (column 6, lines 63-65). Nothing in *Hertz et al* '406 shows, teaches or suggests cooling the target material during its propagation from the input end to the output end

of the capillary tubing as claimed in claims 1 and 6. Rather, *Hertz et al* '406 only discloses cooling by evaporation or heating the nozzle tip.

Since nothing in *Hertz et al* '744 and *Hertz et al* '406 shows, teaches or suggests a) flexible capillary tubing, b) an output end of the capillary tubing having an orifice which is an integral part of the capillary tubing and c) cooling the target material during its propagation from the input end to the output end of the capillary tubing as claimed in claims 1 and 6, applicants respectfully request the Examiner withdraws the rejection to claims 1 and 6 under 35 U.S.C. §103.

Claims 2-5, 7-12 and 19-29 depend from claims 1 and 6 and recite additional features. Applicants respectfully submit that claims 2-5, 7-12 and 19-29 would not have been obvious within the meaning of 35 U.S.C. § 103 over *Hertz et al* '744 and *Hertz et al* '406 at least for the reasons as set forth above. Therefore, applicants respectfully request the Examiner withdraws the rejection to claims 2-5, 7-12 and 19-29 under 35 U.S.C. § 103.

The prior art of record, which is not relied upon, is acknowledged. The references taken singularly or in combination do not anticipate or make obvious the claimed invention.

Thus it now appears that the application is in condition for reconsideration and allowance. Reconsideration and allowance at an early date are respectfully requested.

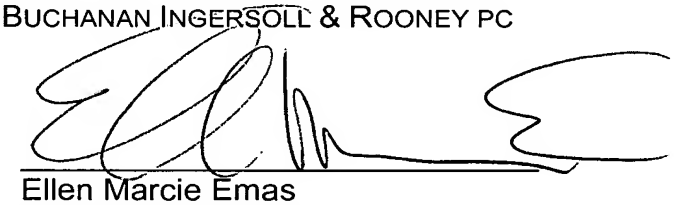
If for any reason the Examiner feels that the application is not now in condition for allowance, the Examiner is respectfully requested to contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed within the currently set shortened statutory period, applicants respectfully petition for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

Date: November 1, 2006 By: 

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